HS12864B 液晶显示模块使用说明书

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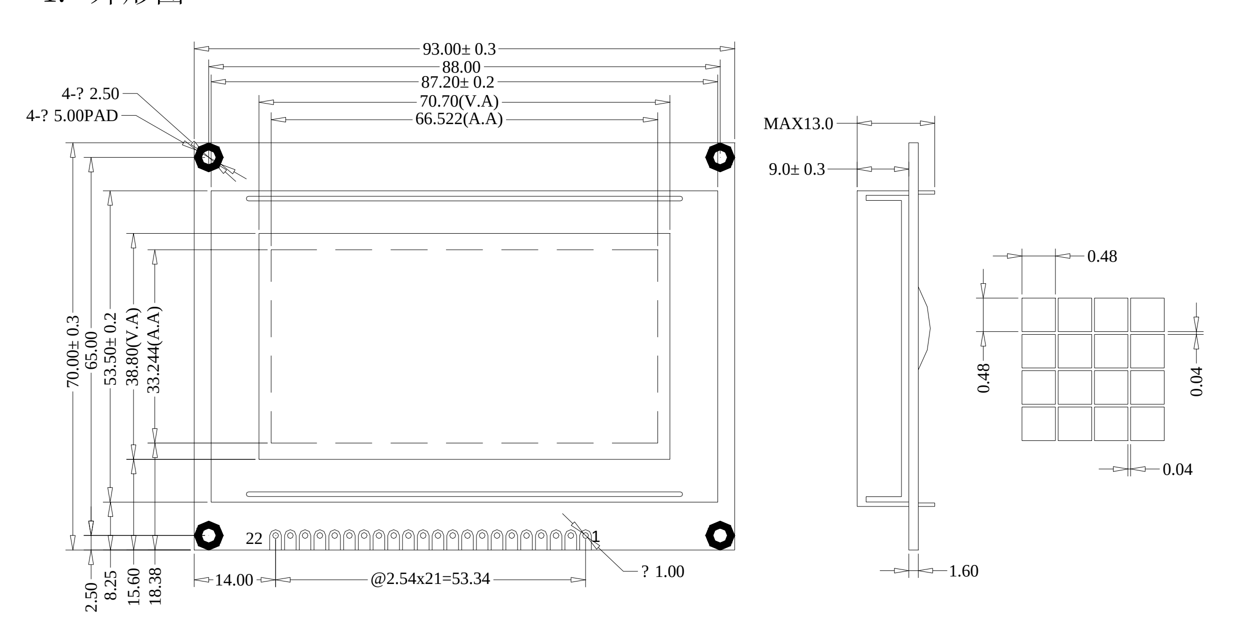
一、　概述

HS12864B 使用 KS0108（或其兼容芯片）作为控制器，适配 M6800 系列时序，具有 8 位标准数据总线。可显示各种字符及图形。每个 KS0108 拥有 64×64 位（512 字节）的显示 RAM，HS12864B 显示屏上的 64×64 点，显示 RAM 中的数据直接作为显示驱动信号。HS12864B 具有操作指令简单，低功耗的特点。HS12864B 采用 COB 工艺制作。

说明: HS12864B 有 STN 黄绿膜，蓝膜以及 FSTN 产品可选，LED 背光有多种颜色可选。用户还可以根据需要自己选定常温、宽温或者超宽温产品。

二、　外形结构

1. 外形图



2. 主要外形尺寸

项　　　　目	标　准　尺　寸	单　位
模　块　体　积	93.0L×70.0W×13.0（max）H	mm
视　　　　域	70.7×38.8	mm
行 列 点 阵 数	128×64	dots
点　　距　　离	0.48×0.48	mm
点　　大　　小	0.52×0.52	mm

三、　硬件说明

1. 接口定义

管脚	符号	电平	功能描述	
1	CS1	L	片选信号 1，低有效，对应左半屏 64×64 点	与 CSA，CSB 不可同时使用
2	CS2	L	片选信号 2，低有效，对应右半屏 64×64 点	
3	VSS	0V	电源地	
4	VDD	5.0V	供电电源，5.0V	
5	V0	负压	LCD 驱动电压输入端（对比度调节）	
6	RS	H/L	寄存器选择端　高：命令寄存器　低：数据寄存器	
7	R/W	H/L	读/写信号　　高：读操作　　低：写操作	
8	E	H，H->L	使能信号	
9～16	DB0～DB7	H/L	数据线	
17	CSA	H	片选信号 1，高有效，对应左半屏 64×64 点	与 CS1，CS2 不可同时使用
18	CSB	H	片选信号 2，高有效，对应右半屏 64×64 点	
19	/RST	H/L	复位信号，低有效	
20	Vout	负压	负压输出端	
21	LEDA	5.0V	背光正极	
22	LEDK	0V	背光负极	

说明:HS12864B 有两套片选信号，分别是 CS1，CS2 和 CSA，CSB，分别是低有效和高有效，以适应不同用户的需求。两套片选信号完全独立，都可以独自作为 HS12864B 的片选使用。使用其中一套时，另外一套必须悬空。

2. 最大工作范围

（1） 逻辑工作电压(Vdd)：4.5～5.5V

（2）电源地（VSS）：　　0V

（3）工作温度(Ta)：　　-20～70℃（宽温）

（4）存储温度(Tstg)：　　-30～80℃

3. 电气特性(测试条件 Ta=25,Vdd=5.0+/-0.25V)

（1）输入高电平(Vih)：　3.5Vmin

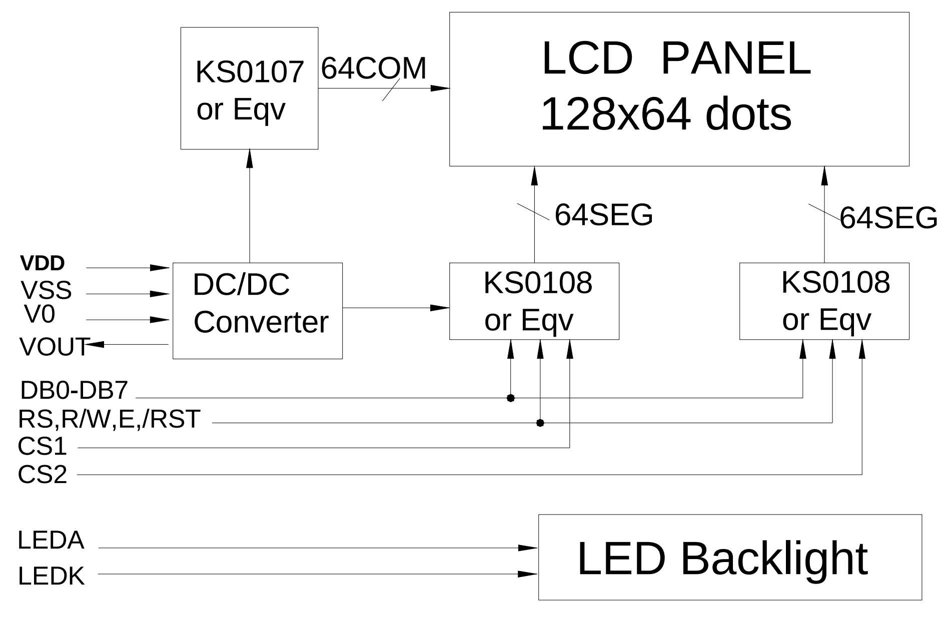
（2）输入低电平(Vil)：　0.55Vmax

（3）输出高电平(Voh)：　3.75Vmin

（4）输出低电平(Vol)：　1.0Vmax

（5）工作电流：　　　　8.0mAmax（注：不含背光电流）

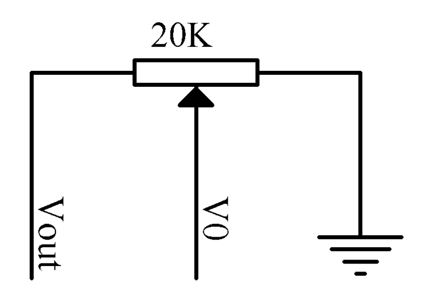
4. 原理简图



12864 点阵模块原理框图

5. HS12864B 的对比度调节

HS12864B 上有负压电路，生成的负压由 Vout 脚输出，加过用户主板返回到液晶模块接口的 V0 端，由此调节对比度。一般的对比度调节电路如下。用户也可以在此原理的基础上使用数字定位器实现对比度的软件调节。



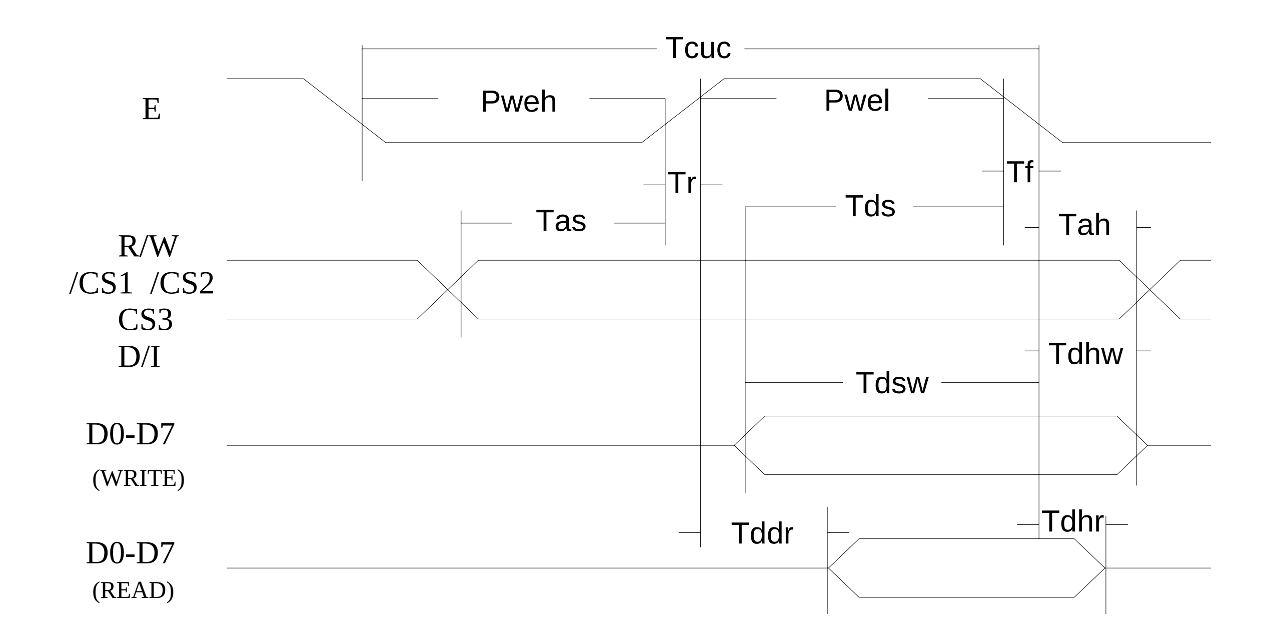
6. HS12864B 的复位电路

HS12864B 提供复位引脚/RST, /RST 是低有效，它将显示开关和显示起始行寄存器清零。HS12864B 液晶模块上配置有 RC 复位电路。(即是 RST 脚对 VCC 接一大约 10K 的电阻，对地接一 0.1uF 电容，电阻的大小影响复位时间)，上电即完成复位，相对应，在对模块的控制器 KS0108 写指令程序之前必须确保复位已经完成，也即是需要一个延时。

用户在使用时可以只将接口的/RST 悬空，只在开机的时候进行液晶屏复位。或者接至 I/O 口，通过软件控制其复位。

特别指出，如果/RST 始终为低或者接地，那么液晶屏就一直处于复位状态，无法正常显示。

四、　时序说明



KS0108的操作时序图

时序参数表（Vdd=2.7~5.5V,Vss=0V Ta= -20℃~+75℃）

项目	符号	最小值	最大值	单位
E 周期时间	Tcyc	1000	—	nS
E 高电平宽度	Pweh	450	—	nS
E 低电平宽度	Pwel	450	—	nS
E 上升时间	Tr	—	25	nS
E 下降时间	Tf	—	25	nS
地址建立时间	Tas	140	—	nS
地址保持时间	Tah	10	—	nS
数据建立时间	Tdsw	200	—	Ns
数据延时时间	Tddr	—	320	Ns
数据保持时间（写）	Tdhw	10	—	nS
数据保持时间（读）	Tdhr	20	—	Ns

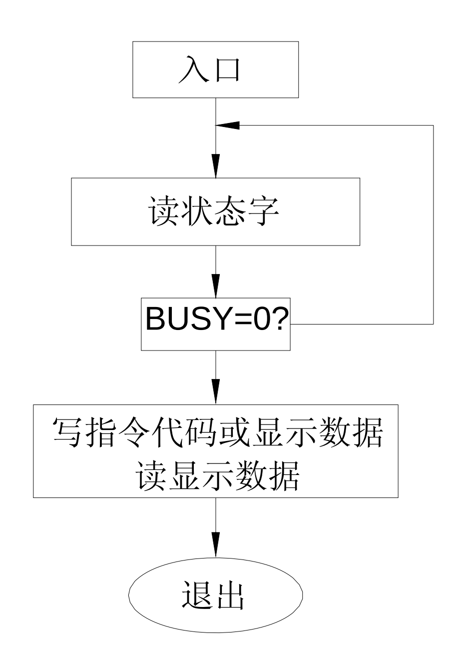
五、　指令说明

1. 指令列表

指令名称	控制状态		指令代码							
	RS	R/W	D7	D6	D5	D4	D3	D2	D1	D0
显示开关设置	0	0	0	0	1	1	1	1	1	D
显示起始行设置	0	0	1	1	L5	L4	L3	L2	L1	L0
页面地址设置	0	0	1	0	1	1	1	P2	P1	P0
列地址设置	0	0	0	1	C5	C4	C3	C2	C1	C0
读取状态字	0	1	BUSY	0	ON/OFF	RESET	0	0	0	0
写显示数据	1	0	数　据							
读显示数据	1	1	数　据							

2. 指令功能详解

下面是 KS0108 指令写入的流程图:



（1）　**读状态字（read status）**

格式

BUSY	0	NO/OFF	RESER	0	0	0	0

- BUSY=1 表示 KS0108 正在处理计算机发来的指令或数据。此时接口电路被封锁，不能接受除读状态字以外的任何操作。BUSY=0 表示 KS0108 接口控制电路已处于“准备好”状态，等待计算机的访问。
- ON/OFF：表示当前的显示状态。ON/OFF=1 表示关显示状态
  ON/OFF=0 表示开显示状态。
- RESET 表示当前 KS0108 的工作状态，即反映 RST 端的电平状态。
  当 RST 为低电平状态时 KS0108 处于复位工作状态，RESET=1。
  当 RST 为高电平状态时，KS0108 为正常工作状态，RESET=0。
- 在占领设置和数据读写时要注意状态字中的 BUSY 标志。只有在 BUSY=0 时，计算机

对 KS0108 的操作才能有效。因此计算机在每次对 KS0108 操作之前，都要读出状态字判断 BUSY 是否为“0”。若不为“0”，则计算机需要等待，直至 BUSY=0 为止。

（2）　显示开关（**display on/off**）

格式								
格式	0	0	1	1	1	1	1	D

该指令设置显示开关/触发器的状态，由此控制显示数据锁存器的工作方式，从而控制显示上的显示状态。

D 位为显示开/关的控制位。当 D=1 为显示设置，显示数据锁存器正常工作，显示屏上呈现所许的效果。此时在状态字中 ON/OFF=0。

当 D=0 为关显示设置，显示数据锁存器被置零，显示屏呈不显示状态，但显示存储器并没有被破坏，在状态组中 ON/OFF=1。

（3）　显示起始行设置（**Display start line**）

格式	1	1	L5	L4	L3	L2	L1	L0

该指令设置了显示起始行寄存器的内容。KS0108 有 64 行显示的管理能力，该指令中 L5~L0 为显示起始行的地址，取值在 0~3FH（1~64）范围内，它规定了显示屏上最顶一行所对应的显示存储器的行地址。如果定时间隔地，等间距地修改（如加一或减一）显示起始行寄存器的内容，则显示屏将呈现显示内容向上或向下平滑滚动的显示效果。

（4）　页面地址设置[Set page(X address)]

格式	1	0	1	1	1	P2	P1	P0

该指令设置了页面地址----X 地址寄存器的内容。KS0108 将显示存储器分成了 8 页，指令代码中 P2~P0 就是要确定当前所要选择的页面地址，取值范围为 0~7H，代表第 1~8 页。该指令规定了以后的读/写操作将在哪一个页面上进行。

（5）　列地址设置(Set Y address)

格式	0	1	C5	C4	C3	C2	C1	C0

该指令设置了 Y 地址计数器的内容，C5~C0=0~3FH（1~64）代表某一页面上的某一单元地址，随后的一次读或写数据将在这个单元上进行。Y 地址计数器具有自动加一功能，在每一次读/写数据后它将自动加一，所以在连续进行读/写数据时，Y 地址计数器不必每次都设置一次。

页面地址的设置和列地址的设置将显示存储器单元唯一地确定下来，为后来的显示数据的读/写作了地址的选通。

（6）　写显示数据(Write display data)

格式	数　　据

该操作将 8 位数据写入先前已确定的显示存储器的单元内，操作完成后列地址计数器自动加一。

（7）　读显示数据（Read display data）

格式	数　　据

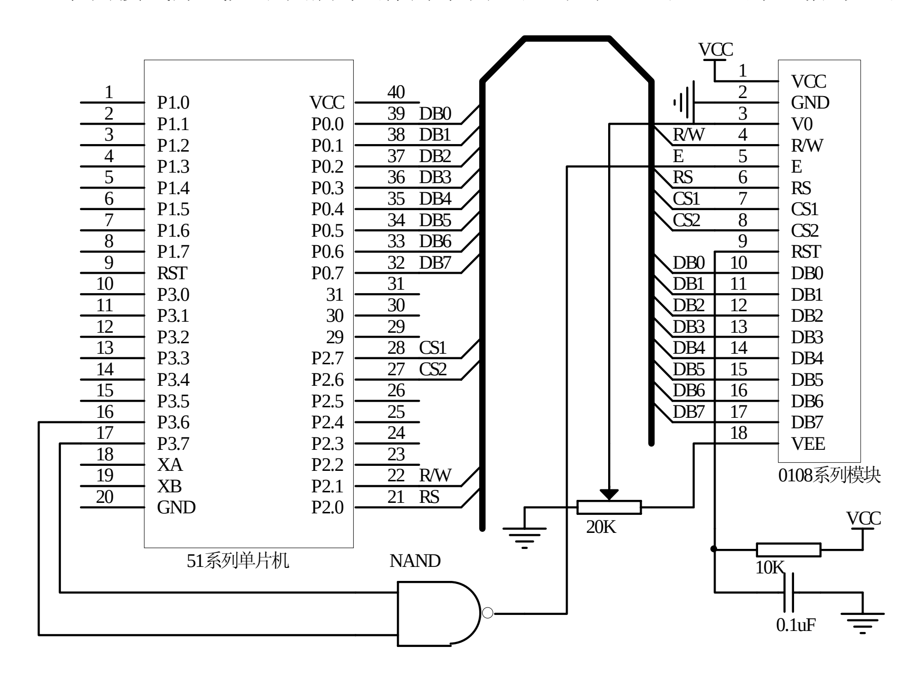
该操作将 KS0108 接口部的输出寄存器内容读出，然后列地址计数器自动加一。

六、　HS12864B 与 MCU 的接口方法

1. 直接访问方式

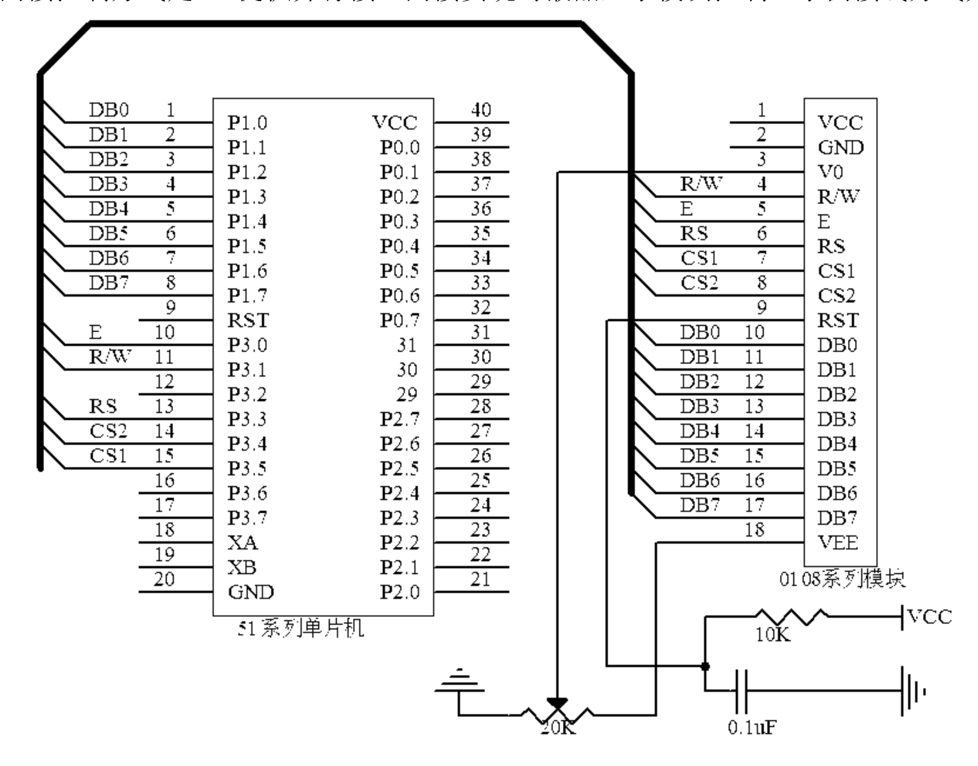
MCU 利用数据总线和控制信号直接采用 I/O 设备访问形式控制 HS12864B。由于 KS0108 控制器适配 M6800 系列的读/写时序，所以在与 Interl8080 时序的计算机连接时需要有时序的转换。写数据通道、读状态字通道以及写指令通道的定义见直接访问方式的演示程序。

示例接线方式如下图所示(作为示例，只针对 CS1 和 CS2 片选信号，以下同)：



2. 间接访问方式

间接控制方式是MCU提供并行接口间接实现对液晶显示模块控制。示例接线方式如下：



3. 演示程序（以间接访问方式为例）

```
;**************************************************************************
;连线表:  CPU=89C52                                                       *
;RS=P3.0            R/W=P3.1            CS1=P3.3        CS2=P3.5          *
;FOSC=12MHz         D0-D7=P1.0-P1.7     E=P3.2          /RSET=/(CPU RSET) *
;**************************************************************************

RS      EQU  P3.3
RW      EQU  P3.1
EN      EQU  P3.0
CS1     EQU  P3.5
CS2     EQU  P3.4
DATBUS  EQU  P1

COM     EQU  30H
DAT     EQU  31H
OX      EQU  32H
OY      EQU  33H
XPAGE   EQU  34H
CODER   EQU  35H
COUNT   EQU  36H
DOT     EQU  37H
CONT    EQU  38H

START:
        ORG   0000H
        LJMP  MAIN
        ORG   0060H

MAIN:
        MOV   SP,#60H
        LCALL DEL_20MS
        MOV   P3,#0F8H    ;CS1=H,CS2=H,无关脚置高
        LCALL INI
        MOV   DPTR,#PIC1
        LCALL WPIC
        MOV   DPTR,#PIC2
        LCALL WPIC
        MOV   DPTR,#PIC3
        LCALL WPIC
        LJMP  MAIN

INI:
        MOV   COM,#0C0H
        LCALL WC1
        LCALL WC2
        MOV   COM,#3FH
        LCALL WC1
        LCALL WC2
        RET

WPIC:
        MOV   XPAGE,#00H
        MOV   R3,#8
WP1:
        MOV   A,XPAGE
        ORL   A,#0B8H
        PUSH  ACC
        MOV   COM,A
        LCALL WC1
        MOV   COM,#40H
        LCALL WC1
        MOV   R2,#64
WP2:
        MOV   A,#00H
        MOVC  A,@A+DPTR
        MOV   DAT,A
        INC   DPTR
        LCALL WD1
        DJNZ  R2,WP2
```

```
        POP   ACC
        MOV   COM,A
        LCALL WC2
        MOV   COM,#40H
        LCALL WC2
        MOV   R2,#64
WP3:
        MOV   A,#00H
        MOVC  A,@A+DPTR
        MOV   DAT,A
        INC   DPTR
        LCALL WD2
        DJNZ  R2,WP3
        INC   XPAGE
        DJNZ  R3,WP1
        LCALL DEL_1500MS
        RET

WC1:
        CLR   CS1
        SETB  CS2
        CLR   RS
        SETB  RW
WC11:
        MOV   P1,#0FFH
        SETB  EN
        MOV   A,P1
        CLR   EN
        JB    ACC.7,WC11
        CLR   RW
        MOV   P1,COM
        SETB  EN
        CLR   EN
        RET

WC2:
        SETB  CS1
        CLR   CS2
        CLR   RS
        SETB  RW
WC21:
        MOV   P1,#0FFH
        SETB  EN
        MOV   A,P1
        CLR   EN
        JB    ACC.7,WC21
        CLR   RW
        MOV   P1,COM
        SETB  EN
        CLR   EN
        RET

WD1:
        CLR   CS1
        SETB  CS2
        CLR   RS
        SETB  RW
WD11:
        MOV   P1,#0FFH
        SETB  EN
        MOV   A,P1
        CLR   EN
        JB    ACC.7,WD11
        SETB  RS
        CLR   RW
        MOV   P1,DAT
        SETB  EN
        CLR   EN
        RET
```

```
WD2:
       SETB  CS1
       CLR   CS2
       CLR   RS
       SETB  RW
WD21:
       MOV   P1,#0FFH
       SETB  EN
       MOV   A,P1
       CLR   EN
       JB    ACC.7,WD21
       SETB  RS
       CLR   RW
       MOV   P1,DAT
       SETB  EN
       CLR   EN
       RET

DEL_20MS:
       MOV   R0,#20
D2:
       MOV   R1,#200
D1:
       NOP
       NOP
       NOP
       DJNZ  R1,D1
       DJNZ  R0,D2
       RET

DEL_100MS:
      LCALL  DEL_20MS
      LCALL  DEL_20MS
      LCALL  DEL_20MS
      LCALL  DEL_20MS
      LCALL  DEL_20MS
      RET

DEL_500MS:
      LCALL  DEL_100MS
      LCALL  DEL_100MS
      LCALL  DEL_100MS
      LCALL  DEL_100MS
      LCALL  DEL_100MS
      RET

DEL_1500MS:
      LCALL  DEL_500MS
      LCALL  DEL_500MS
      LCALL  DEL_500MS
      RET

PIC1:
DB   0FFH,0FFH,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,
DB   003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,
DB   003H,003H,083H,083H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,
DB   003H,003H,003H,003H,003H,003H,003H,003H,003H,043H,0C3H,0C3H,003H,003H,003H,003H,
DB   003H,003H,003H,083H,083H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,
DB   003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,
DB   003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,
DB   003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,0FFH,0FFH,
DB   0FFH,0FFH,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,
DB   000H,000H,000H,010H,030H,031H,0A3H,0C3H,040H,00EH,02FH,0B1H,0BDH,0EDH,0E1H,085H,
DB   08DH,0D9H,0D3H,083H,001H,000H,000H,000H,000H,000H,000H,040H,060H,0FFH,0FFH,
DB   021H,020H,000H,0FEH,0FEH,000H,0FCH,0FCH,000H,000H,0FFH,0FFH,000H,000H,000H,000H,
DB   000H,010H,030H,030H,021H,0C3H,0C3H,00AH,01AH,072H,0E2H,0C2H,0F2H,07FH,03FH,007H,
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,03EH,0FEH,0CAH,0CAH,0CAH,
DB   0CAH,04AH,0CAH,0CAH,0FEH,03EH,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,0FFH,0FFH,
DB   0FFH,0FFH,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,
DB   000H,000H,000H,010H,038H,03CH,01FH,043H,060H,031H,019H,00DH,007H,0FFH,0FFH,006H,
```

```
DB   00CH,01CH,038H,030H,030H,020H,020H,000H,000H,000H,008H,008H,00CH,00CH,007H,007H,
DB   042H,073H,03DH,00FH,003H,000H,00FH,00FH,000H,0C0H,0FFH,0FFH,000H,000H,000H,000H,
DB   000H,010H,038H,03CH,03FH,033H,010H,018H,00CH,006H,007H,003H,007H,00EH,01CH,01CH,
DB   018H,010H,010H,010H,000H,000H,000H,000H,084H,084H,0C4H,065H,03DH,01FH,007H,004H,
DB   004H,004H,07FH,07FH,004H,004H,004H,004H,000H,000H,000H,000H,000H,000H,000H,000H,
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,0FFH,0FFH,
DB   0FFH,0FFH,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,080H,
DB   0C0H,040H,040H,068H,038H,0B0H,0A0H,020H,060H,060H,000H,000H,000H,000H,000H,000H,
DB   000H,000H,000H,0E0H,0E0H,000H,0F0H,0F0H,000H,000H,000H,000H,000H,000H,000H,000H,
DB   040H,040H,040H,040H,0C0H,0E0H,078H,058H,060H,020H,020H,020H,020H,020H,000H,000H,
DB   000H,0C0H,0E0H,0A0H,0E0H,060H,0E0H,0E0H,0A0H,0B0H,0F0H,0F0H,000H,000H,000H,000H,
DB   000H,000H,000H,000H,000H,0C0H,0C0H,010H,010H,070H,0E0H,080H,000H,000H,000H,000H,
DB   000H,000H,000H,000H,000H,000H,020H,0A0H,0A0H,0B0H,090H,010H,010H,0F0H,0F0H,000H,
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,0FFH,0FFH,
DB   0FFH,0FFH,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,021H,
DB   021H,024H,0ADH,0FBH,072H,03FH,05FH,0C8H,088H,088H,008H,000H,000H,000H,000H,080H,
DB   082H,08EH,08CH,0FFH,0FFH,040H,07FH,07FH,04CH,046H,043H,043H,040H,000H,000H,020H,
DB   030H,018H,00CH,006H,0FFH,0FFH,02AH,02BH,029H,0FFH,0FFH,000H,000H,000H,000H,000H,
DB   000H,0FFH,0FFH,005H,007H,006H,0FFH,0FFH,0CEH,05AH,03BH,06DH,064H,040H,040H,040H,
DB   000H,010H,018H,00CH,0C7H,0E3H,0B0H,09CH,0CCH,050H,070H,0E1H,0C3H,006H,006H,004H,
DB   004H,000H,000H,000H,01CH,03DH,025H,025H,036H,01EH,01EH,080H,080H,0FFH,0FFH,000H,
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,0FFH,0FFH,
DB   0FFH,0FFH,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,002H,
DB   002H,003H,001H,000H,000H,000H,000H,000H,001H,001H,000H,000H,000H,000H,000H,000H,
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,
DB   000H,000H,000H,000H,003H,003H,000H,001H,003H,003H,001H,000H,000H,000H,000H,000H,
DB   000H,001H,001H,000H,000H,000H,001H,001H,000H,000H,000H,000H,000H,000H,000H,000H,
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,001H,001H,000H,000H,
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,0FFH,0FFH,
DB   0FFH,0FFH,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,0F8H,0FEH,006H,
DB   086H,0FEH,078H,000H,000H,004H,006H,0F2H,0FEH,00EH,000H,000H,000H,000H,00CH,01EH,
DB   0F2H,0F2H,000H,000H,000H,000H,00CH,01EH,0F2H,0F2H,000H,000H,020H,020H,020H,020H,
DB   020H,020H,020H,000H,000H,0CEH,0FEH,032H,0FEH,0CEH,000H,000H,000H,0F0H,0FCH,03EH,
DB   0F2H,0F0H,000H,000H,000H,000H,002H,0FEH,0FEH,000H,000H,000H,000H,000H,002H,0FEH,
DB   0FEH,000H,000H,000H,000H,070H,078H,04CH,0FEH,0FEH,000H,000H,000H,000H,002H,012H,
DB   03EH,0EEH,0C0H,000H,000H,000H,002H,0FEH,0FEH,000H,000H,000H,000H,004H,086H,0E2H,
DB   07EH,01EH,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,0FFH,0FFH,
DB   0FFH,0FFH,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C1H,0C3H,
DB   0C3H,0C1H,0C0H,0C0H,0C0H,0C0H,0C1H,0C1H,0C0H,0C0H,0C0H,0C0H,0C0H,0C1H,0C3H,0C3H,
DB   0C1H,0C0H,0C0H,0C0H,0C0H,0C1H,0C3H,0C3H,0C1H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,
DB   0C0H,0C0H,0C0H,0C0H,0C0H,0C1H,0C3H,0C2H,0C3H,0C1H,0C0H,0C0H,0C0H,0C1H,0C3H,0C2H,
DB   0C3H,0C1H,0C0H,0C0H,0C0H,0C0H,0C1H,0C1H,0C1H,0C0H,0C0H,0C0H,0C0H,0C0H,0C1H,0C1H,
DB   0C1H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C1H,0C1H,0C0H,0C0H,0C0H,0C0H,0C3H,0C3H,
DB   0C3H,0C1H,0C0H,0C0H,0C0H,0C0H,0C1H,0C1H,0C1H,0C0H,0C0H,0C0H,0C0H,0C1H,0C1H,0C1H,
DB   0C1H,0C1H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0FFH,0FFH,

PIC2:
DB   0FFH,0FFH,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,
DB   003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,
DB   003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,
DB   003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,
DB   003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,
DB   003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,
DB   003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,
DB   003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,0FFH,0FFH,
DB   0FFH,0FFH,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,010H,
DB   018H,018H,0F8H,0FCH,0FCH,0FEH,0FEH,000H,000H,000H,000H,000H,000H,000H,070H,038H,
DB   01CH,01CH,01EH,03EH,07EH,0FEH,0FEH,0FCH,0F8H,0F0H,000H,000H,000H,000H,0F0H,0F8H,
DB   0FCH,0FCH,0FEH,0C6H,082H,002H,002H,006H,0FEH,0FCH,0F8H,0F0H,000H,000H,000H,020H,
DB   070H,0E0H,0C0H,080H,000H,000H,000H,000H,080H,0C0H,0E0H,070H,020H,000H,000H,000H,
DB   000H,000H,080H,0E0H,0F0H,0F0H,038H,01CH,00CH,00CH,006H,006H,002H,002H,000H,000H,
DB   000H,000H,000H,000H,000H,080H,060H,0F0H,0F8H,0FEH,0FEH,0FEH,000H,000H,000H,000H,
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,0FFH,0FFH,
DB   0FFH,0FFH,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,
DB   000H,000H,0FFH,0FFH,0FFH,0FFH,0FFH,000H,000H,000H,000H,000H,000H,000H,000H,000H,
DB   000H,000H,080H,0C0H,0F0H,07FH,03FH,00FH,007H,001H,000H,000H,000H,000H,080H,0C3H,
DB   0E7H,0E7H,03FH,01FH,03FH,07FH,0FEH,0FFH,0FFH,0F9H,0F1H,0C0H,000H,000H,000H,000H,
DB   080H,0C0H,0E1H,073H,03FH,01EH,01EH,03FH,073H,0E1H,0C0H,080H,000H,000H,000H,000H,
DB   0F8H,0FFH,0FFH,0FFH,0FFH,003H,002H,002H,00EH,0FEH,0FEH,0FCH,0F8H,0F0H,000H,000H,
DB   0E0H,0D0H,0C8H,0C6H,0C1H,0C0H,0C0H,0FFH,0FFH,0FFH,0FFH,0FFH,0C0H,0C0H,000H,000H,
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DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,0FFH,0FFH,
DB   0FFH,0FFH,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,020H,
DB   020H,020H,03FH,03FH,03FH,03FH,03FH,030H,020H,020H,000H,000H,000H,020H,030H,038H,
DB   03CH,03EH,03FH,03DH,03CH,03CH,03CH,03CH,03CH,03EH,003H,000H,000H,000H,007H,00FH,
DB   01FH,03FH,030H,020H,020H,020H,030H,03FH,01FH,01FH,00FH,003H,000H,000H,000H,001H,
DB   003H,001H,000H,000H,000H,000H,000H,000H,000H,000H,001H,003H,001H,000H,000H,000H,
DB   001H,007H,00FH,01FH,01FH,03CH,020H,020H,030H,03FH,01FH,01FH,00FH,003H,000H,000H,
DB   001H,001H,001H,001H,001H,001H,001H,03FH,03FH,03FH,03FH,03FH,001H,001H,000H,000H,
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,0FFH,0FFH,
DB   0FFH,0FFH,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,
DB   0C0H,0C0H,0C0H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,
DB   000H,000H,000H,000H,000H,000H,000H,000H,0C0H,0C0H,000H,000H,000H,000H,000H,000H,
DB   000H,000H,000H,000H,000H,000H,000H,080H,080H,000H,000H,000H,080H,080H,000H,000H,
DB   000H,0C0H,0C0H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,
DB   000H,080H,080H,080H,080H,080H,080H,080H,080H,080H,080H,080H,080H,080H,000H,000H,
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,
DB   000H,000H,000H,080H,080H,080H,000H,000H,000H,000H,000H,000H,000H,000H,0FFH,0FFH,
DB   0FFH,0FFH,000H,000H,000H,000H,000H,000H,080H,080H,0C0H,060H,070H,058H,04EH,047H,
DB   043H,0C1H,0C3H,047H,04CH,07CH,078H,070H,060H,060H,040H,040H,000H,000H,000H,000H,
DB   000H,000H,000H,0E0H,0E0H,020H,020H,020H,03FH,03FH,022H,022H,022H,0E2H,0E2H,022H,
DB   002H,000H,000H,000H,000H,000H,000H,0FFH,0FFH,001H,039H,07FH,0C7H,083H,0C2H,0FAH,
DB   0BFH,08FH,0FBH,0FAH,092H,082H,0C2H,042H,002H,000H,000H,000H,000H,000H,000H,000H,
DB   000H,07FH,07FH,048H,0C8H,0C8H,048H,048H,0C8H,0C8H,048H,07FH,07FH,000H,000H,000H,
DB   000H,000H,000H,000H,020H,020H,020H,021H,021H,0A1H,0A1H,0A1H,021H,0E1H,0E1H,021H,
DB   0A1H,0A1H,021H,021H,020H,030H,010H,000H,000H,000H,000H,000H,000H,000H,0FFH,0FFH,
DB   0FFH,0FFH,000H,000H,000H,000H,000H,000H,000H,080H,080H,084H,084H,084H,084H,084H,
DB   084H,0FFH,0FFH,084H,084H,084H,084H,084H,084H,080H,080H,000H,000H,000H,000H,000H,
DB   080H,0C0H,0F0H,03FH,00FH,004H,0E4H,0E4H,084H,004H,024H,0E4H,0C4H,00FH,01FH,070H,
DB   0E0H,0C0H,000H,000H,000H,000H,000H,0FFH,0FFH,004H,00CH,00CH,00FH,00FH,008H,008H,
DB   008H,008H,0FFH,0FFH,008H,008H,008H,00CH,00CH,008H,000H,000H,000H,080H,080H,080H,
DB   086H,0BEH,0B8H,090H,0FFH,0FFH,080H,080H,0FFH,0FFH,0B0H,098H,08EH,086H,082H,082H,
DB   000H,000H,000H,000H,040H,060H,030H,01CH,00EH,007H,083H,080H,080H,0FFH,0FFH,000H,
DB   000H,001H,003H,006H,01CH,038H,030H,000H,000H,000H,000H,000H,000H,000H,0FFH,0FFH,
DB   0FFH,0FFH,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,
DB   0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,
DB   0C1H,0C1H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,
DB   0C1H,0C1H,0C0H,0C0H,0C0H,0C0H,0C0H,0C1H,0C1H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,
DB   0C0H,0C0H,0C1H,0C1H,0C1H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,
DB   0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,
DB   0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C1H,0C1H,0C1H,0C0H,
DB   0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0FFH,0FFH,

PIC3:
DB   0FFH,0FFH,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,
DB   003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,
DB   003H,003H,003H,003H,0E3H,0E3H,003H,003H,003H,003H,003H,003H,003H,003H,003H,083H,
DB   083H,003H,003H,003H,083H,0C3H,0C3H,003H,003H,003H,003H,003H,003H,003H,003H,003H,
DB   003H,043H,0C3H,083H,003H,003H,043H,043H,0C3H,083H,003H,003H,003H,003H,003H,003H,
DB   003H,003H,043H,0C3H,083H,083H,083H,083H,0C3H,043H,043H,0C3H,0C3H,003H,003H,003H,
DB   003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,
DB   003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,003H,0FFH,0FFH,
DB   0FFH,0FFH,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,014H,0B4H,0E6H,
DB   0FEH,0BEH,008H,08FH,0F7H,0F6H,08AH,00EH,006H,002H,000H,000H,000H,008H,008H,028H,
DB   0F9H,0D9H,03FH,03FH,031H,010H,0FEH,0FFH,011H,01FH,01FH,000H,000H,000H,008H,008H,
DB   00CH,0FCH,0FCH,0C0H,0C4H,0C4H,064H,03CH,01EH,0F2H,0F2H,002H,002H,002H,000H,000H,
DB   000H,0FFH,0FFH,000H,038H,038H,02CH,024H,03CH,01CH,000H,0FFH,0FFH,000H,000H,000H,
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,0FFH,0FFH,
DB   0FFH,0FFH,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,0E0H,0E0H,002H,083H,081H,000H,
DB   000H,004H,006H,003H,001H,000H,001H,003H,0C6H,0C6H,004H,084H,080H,001H,001H,001H,
DB   001H,001H,001H,001H,001H,003H,002H,002H,006H,086H,086H,002H,002H,000H,000H,0C0H,
DB   0C0H,001H,003H,003H,001H,000H,002H,006H,087H,083H,080H,080H,080H,080H,080H,0C0H,
DB   040H,043H,0C3H,0C0H,000H,000H,000H,000H,000H,000H,082H,087H,007H,000H,000H,000H,
DB   000H,0C0H,0C0H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,0FFH,0FFH,
DB   0FFH,0FFH,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,
DB   000H,000H,000H,000H,000H,090H,092H,0FEH,0FFH,069H,02FH,0BFH,0FCH,0E4H,035H,015H,
DB   000H,000H,000H,000H,010H,018H,00CH,0FFH,0FFH,000H,0FEH,0FEH,001H,001H,001H,001H,
DB   0FFH,0FFH,000H,000H,000H,000H,0F8H,0FCH,02EH,02FH,0FDH,0FCH,018H,01CH,077H,067H,
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DB   006H,0FEH,0FEH,000H,000H,000H,000H,000H,0FFH,0FFH,06CH,038H,0BEH,0EEH,068H,038H,
DB   03EH,06EH,0FFH,0FFH,000H,000H,000H,000H,008H,028H,068H,0CDH,0F5H,0F4H,084H,0C0H,
DB   0C0H,07FH,03FH,026H,0E2H,0E2H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,0FFH,0FFH,
DB   0FFH,0FFH,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,
DB   000H,000H,000H,001H,001H,001H,002H,007H,007H,001H,001H,001H,000H,001H,003H,006H,
DB   00FH,00FH,000H,000H,000H,000H,000H,007H,007H,000H,003H,003H,000H,000H,000H,002H,
DB   007H,007H,000H,000H,000H,000H,000H,003H,003H,001H,003H,003H,000H,000H,000H,002H,
DB   006H,007H,003H,000H,000H,000H,000H,000H,003H,003H,000H,000H,000H,000H,000H,000H,
DB   002H,006H,007H,003H,000H,000H,000H,002H,002H,002H,003H,001H,000H,000H,000H,007H,
DB   007H,002H,002H,002H,003H,001H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,
DB   000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,000H,0FFH,0FFH,
DB   0FFH,0FFH,000H,020H,0E0H,0E0H,000H,0A0H,0E0H,0A0H,000H,0E0H,020H,020H,0E0H,0E0H,
DB   000H,0A0H,0E0H,0A0H,000H,0E0H,020H,020H,0E0H,0E0H,000H,0A0H,0E0H,0A0H,000H,0E0H,
DB   020H,000H,000H,000H,000H,004H,0FCH,0FCH,040H,020H,0E0H,0C0H,000H,000H,0C0H,0E0H,
DB   0A0H,020H,060H,000H,004H,0FCH,0FCH,000H,000H,0C0H,0E0H,020H,060H,060H,000H,020H,
DB   0E0H,0E0H,040H,020H,0E0H,0C0H,020H,020H,0E0H,0C0H,000H,000H,000H,000H,000H,000H,
DB   0C0H,0E0H,020H,060H,060H,000H,000H,0C0H,0E0H,020H,020H,0E0H,0C0H,000H,020H,0E0H,
DB   0E0H,040H,020H,0E0H,0C0H,020H,020H,0E0H,0C0H,000H,000H,000H,000H,000H,000H,0C0H,
DB   0E0H,020H,060H,060H,000H,020H,0E0H,0E0H,040H,020H,0E0H,0C0H,000H,000H,0FFH,0FFH,
DB   0FFH,0FFH,000H,000H,001H,00FH,00EH,001H,001H,00FH,00EH,001H,000H,000H,001H,00FH,
DB   00EH,001H,001H,00FH,00EH,001H,000H,000H,001H,00FH,00EH,001H,001H,00FH,00EH,001H,
DB   000H,000H,00CH,00CH,000H,008H,00FH,00FH,008H,000H,00FH,00FH,008H,000H,00CH,009H,
DB   00BH,00FH,006H,000H,008H,00FH,00FH,008H,000H,007H,00FH,008H,008H,004H,000H,008H,
DB   00FH,00FH,008H,000H,00FH,00FH,008H,000H,00FH,00FH,008H,000H,00CH,00CH,000H,000H,
DB   007H,00FH,008H,008H,004H,000H,000H,007H,00FH,008H,008H,00FH,007H,000H,008H,00FH,
DB   00FH,008H,000H,00FH,00FH,008H,000H,00FH,00FH,008H,000H,00CH,00CH,000H,000H,007H,
DB   00FH,008H,008H,004H,000H,008H,00FH,00FH,008H,000H,00FH,00FH,008H,000H,0FFH,0FFH,
DB   0FFH,0FFH,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,
DB   0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,
DB   0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,
DB   0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,
DB   0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,
DB   0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,
DB   0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,
DB   0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0C0H,0FFH,0FFH

END
```

4. 直接访问方式程序入口

```
;*****************************************************
;RS=P2.0  R/W=P2.1  CS1=P2.7  CS2=P2.6  CPU=89C52    *
;D0-D7=P0.0-P0.7   FOSC=12MHz                        *
;*****************************************************
以下定义指令通道和数据通道
    D1   EQU   8101H    ;IC-1写数据
    C1   EQU   8000H    ;IC-1写指令
    D2   EQU   4101H    ;IC-2写数据
    C2   EQU   4000H    ;IC-2写指令
```

程序略。

七、　液晶使用注意事项

附录 1：各种背光电参数

序号	类型	工作电压	每颗灯电流	备注
1	LED 黄绿侧光	4.1V	10mA	
2	LED 黄绿底光	4.1V	10mA	
3	LED 白色侧光	3.0V	15mA	
4	EL 黄光	70VAC	-	需逆变器
5	EL 蓝光	70VAC	-	需逆变器
6	CCFL	逆变器 5V	-	需逆变器

注：以上参数仅作参考，不同型号的背光会稍差异，具体见相关产品资料。

附录 2：注意事项

十分感谢您购买汉升公司的产品，在使用前请您首先仔细阅读以下注意事项，以免给您造成不必要的损失，您在使用过程中遇到困难时，请拨打我们的服务电话 0755-86114312-8072，我们将尽力为您提供服务和帮助。

1．处理保护膜

在装好的模块成品表面贴有一层保护膜，以防在装配时沾污显示表面，在整机装配结束前不得撕去，以免弄脏或损坏表面。

2．加装衬垫

在模块和前面板之间最好加装一块约 0.1 毫米左右的衬垫。面板还应保持平整，以免在装配后产生扭曲，并可提高其抗振性能。

3．严防静电

模块中的控制、驱动电压是很低、微功耗的 CMOS 电路，极易被静电击穿，静电击穿是一种不可修复的损坏，而人体有时会产生高达几十伏或上百伏的静电，所以，在操作、装配以及使用中都应极其小心，严防静电。为此：

（1）　不要用手随意去摸外引线、电路板上的电路及金属框。
（2）　如必须直接接触时，应使人体与模块保持在同一电位，或使人体良好接地。
（3）　焊接使用的烙铁及装配使用的电动工具必须良好接地，没有漏电。
（4）　不得使用真空吸尘器进行清洁处理，因为它会产生很强的静电。
（5）　空气干燥也会产生静电，因此，工作间湿度应在 RH60%以上。
（6）　取出或放回包装袋或移动位置时，也需小心，防止产生静电。不要随意更换包装或舍弃原包装。

4．装配操作时的注意事项

（1）　模块是经过精心设计组装而成的，请勿随意自行加工、修整。
（2）　金属框爪不得随意扭动、拆卸。

（3）　不要随意修改加工 PCB 板外形、装配孔、线路及其部件。
（4）　不得修改导电胶条。
（5）　不得修改任何内部支架。
（6）　不要碰、摔、折曲、扭动模块。

5．焊接

在焊接外引线时，应按如下规程进行操作。
（1）　烙铁头温度小于 280 度。
（2）　焊接时间不超过 4 秒。
（3）　焊接材料：共晶型、低熔点。
（4）　不要使用酸性助焊剂。
（5）　重复焊接不要超过三次，且每次重复需间隔 5 分钟。

6．模块的使用与保养

（1）　模块的外引线决不允许接错，在您想调试液晶模块时，请注意正确接线，尤其是正负电源的接线不能接错，否则可能造成过流、过压烧电路上的芯片等对液晶模块元器件有损的现象。
（2）　模块在使用时，接入电源及断开电源，必须在正电源稳定接入以后才能输入信号电平。如在电源稳定前或断开后输入信号电平，有可能损坏模块中的 IC 及电路。
（3）　点阵液晶模块显示时的对比度、视角与温度、驱动电压的关系很大，所以，如果驱动电压过高，不仅会影响显示效果，还会缩短模块的使用寿命。
（4）　因为液晶材料的物理特性，液晶的的对比度会随温度的变化而相应变化，所以，您加的负压也应随温度作相应调整。大致是温度变化 10 度，电压变化 1 伏。为满足这一要求，您可以做一个温度补偿电路，或者安排一个电位器，随温度调整负电压值。
（5）　不应在规定工作温度范围外使用，并且不应在超过存储极限温度的范围外存储。如果温度低于结晶温度，液晶就会结晶，如果温度过高，液晶将变成各向同性的液晶，破坏分子取向，使器件报废。

（6）　用力按显示部分，会产生异常显示。这时切断电源，稍待片刻重新上电，即恢复正常。
（7）　液晶显示器件或模块表面结雾时，不要通电工作，因为这将引起电极化学反应，产生断线。
（8）　长期用于阳光及强光下时，被遮部分会产生残留现象。

7．液晶模块的存储

若长期（如几年以上）存储，我们推荐以下方式：
（1）　装入聚乙稀口袋（最好有防静电涂层）并将口封住
（2）　在-10° C --- +35° C 之间存储。
（3）　放在暗处，避强光。
（4）　决不能在表面压放任何物品。
（5）　严格避免在极限温度/湿度条件下存放。

8．有限责任和保修

如果汉升公司和客户没有发生任何协议,汉升公司将从发货日期算起一年内依据汉升公司液晶显示模块接受标准（按要求提供复印件）更换或修理功能性故障的液晶显示模块。

外观/视觉毛病必须从发货日计起 90 天内送返汉升公司。日期的确认将根据货运文件。汉升公司保证的责任限于上述提及项目的维修和更换，汉升公司不对突发性事件负责任。

保修是以上述注意事项未被忽视为先决条件的，典型的违反例子如下：

（1）断裂的液晶显示屏玻璃。

（2）线路板孔修改或损坏。

（3）线路板布线损坏。

（4）电路修改，包括元件的增加。

（5）线路板随意研磨、雕刻或油漆。

（6）焊接或更改玻璃框。

模块维修将基于双方协议下列出给顾客的清单。模块必须与防静电包装和故障详细陈述一起送回。顾客安装的连接器或电缆必须坏线路板孔，线路和引线端条件下全部移去在不破坏线路板孔，线路和引线端条件下全部移去。